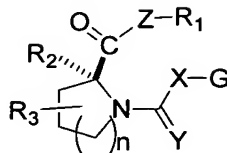


## WHAT IS CLAIMED IS:

1. A compound of the formula I



I

wherein

- 10  $R_1$  is selected from the group consisting of hydrogen, alkyl or substituted alkyl, alkenyl or substituted alkenyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl and  $\text{CH}_2\text{OR}_4$ ;

- 15  $R_2$  is selected from the group consisting of hydrogen, alkyl or substituted alkyl, alkenyl or substituted alkenyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, heterocyclo or substituted heterocyclo, heteroaryl or substituted heteroaryl and  $\text{CH}_2\text{OR}_4$ ;

$R_3$  is selected from the group consisting of hydrogen, alkyl or substituted alkyl,  $\text{CH}_2\text{OR}_4$ ,  $\text{OR}_2$ ,  $\text{SR}_2$ , halo,  $\text{NHR}_2$ ,  $\text{NHCOR}_4$ ,  $\text{NHCO}_2\text{R}_4$ ,  $\text{NHCONR}_4\text{R}_4'$  and  $\text{NHSO}_2\text{R}_4$ ;

- 20  $R_4$  and  $R_4'$  for each occurrence are each independently selected from the group consisting of hydrogen, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, heterocyclo or substituted heterocyclo and heteroaryl or substituted heteroaryl;

- 25  $G$  is a mono- or polycyclic ring system selected from the group consisting of aryl, heterocyclo and heteroaryl, wherein said ring system may optionally substituted with one or more substituents selected from the group consisting of hydrogen, halo, CN,  $\text{CF}_3$ ,  $\text{OR}_4$ ,  $\text{CO}_2\text{R}_4$ ,  $\text{NR}_4\text{R}_4'$ ,  $\text{CONR}_4\text{R}_4'$ ,  $\text{CH}_2\text{OR}_4$ ,  $\text{SR}_4$ ,  $\text{SOR}_4$ ,  $\text{SO}_2\text{R}_4$ ,  $\text{NO}_2$ , alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl,

cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl and heteroaryl or substituted heteroaryl;

X is a linking group selected from the group consisting of  $\text{NR}_4$  and  $\text{CHR}_4$ ;

Y is selected from the group consisting of O,  $\text{NR}_4$ ,  $\text{NOR}_4$ , S and CH;

5 Z is -O- or  $\text{NR}_4$ ; and

n is an integer of 1 or 2;

including all prodrug esters, pharmaceutically acceptable salts and stereoisomers thereof,

with the following provisos:

10 (a) when Y is  $\text{NOR}_4$ ,  $\text{R}_4$  is not hydrogen;

(b) excluding compounds where the following occur simultaneously:

$\text{R}_1$  is methyl;

X is NH;

Y is O or S; and

15 Z is O;

(c) excluding compounds where the following occur simultaneously:

$\text{R}_1$  is methyl;

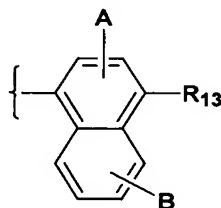
X is NH;

Z is O;

20 Y is  $\text{NR}_4$ ;

$\text{R}_4$  is selected from the group consisting of hydrogen, alkyl or substituted alkyl, alkenyl or substituted alkenyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl and heteroaryl or substituted heteroaryl; and

25 G has the following structure:



wherein

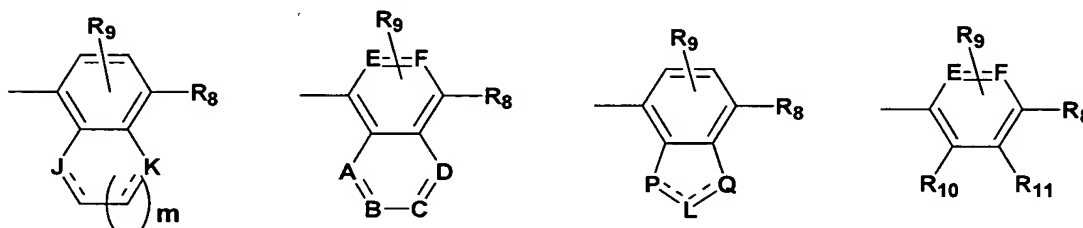
$R_{13}$  is selected from the group consisting of hydrogen, cyano (-CN), nitro (-NO<sub>2</sub>), halo, heterocyclo, OR<sub>14</sub>, CO<sub>2</sub>R<sub>15</sub>, CONHR<sub>15</sub>, COR<sub>15</sub>, S(O)<sub>p</sub>R<sub>15</sub>, SO<sub>2</sub>NR<sub>15</sub>R<sub>15</sub>', NHCOR<sub>15</sub> and NHSO<sub>2</sub>R<sub>15</sub>;

$R_{14}$  in each functional group is independently selected from the group consisting of hydrogen, alkyl or substituted alkyl, CHF<sub>2</sub>, CF<sub>3</sub> and COR<sub>15</sub>;

$R_{15}$  and  $R_{15}'$  in each functional group are each independently selected from the group consisting of hydrogen, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, heterocycloalkyl or substituted heterocycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, heteroaryl or substituted heteroaryl and -CN;

A and B are each independently selected from the group consisting of hydrogen, halo, cyano(-CN), nitro(-NO<sub>2</sub>), alkyl or substituted alkyl and OR<sub>14</sub>; and p is an integer from 0 to 2.

2. The compound as defined in claim 1 wherein G is selected from:



wherein

$R_8$ ,  $R_9$ ,  $R_{10}$  and  $R_{11}$  are each independently selected from the group consisting of hydrogen (H), NO<sub>2</sub>, CN, CF<sub>3</sub>, OR<sub>4</sub>, CO<sub>2</sub>R<sub>4</sub>, NR<sub>4</sub>R<sub>4</sub>', CONR<sub>4</sub>R<sub>4</sub>', CH<sub>2</sub>OR<sub>4</sub>, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl and heteroaryl or substituted heteroaryl;

A to F is each independently selected from N or CR<sub>1</sub>;

J, K, L, P and Q are each independently selected from NR<sub>12</sub>, O, S, SO, SO<sub>2</sub> or CR<sub>12</sub>R<sub>12</sub>';

$R_{12}$  and  $R_{12}'$  in each functional group are each independently selected from a bond or R<sub>1</sub>; and

m is an integer of 0 or 1.

3. The compound as defined in claim 2 wherein  $R_8$  is CN.

5 4. The compound as defined in claim 1 wherein

$R_1$  is hydrogen or alkyl;

$R_2$  is hydrogen or alkyl;

$R_3$  is hydroxyl;

X is  $NR_4$ ;

10 Y is O;

Z is O; and

n is 1

15 5. A pharmaceutical composition comprising the compound as defined in claim 1 and a pharmaceutically acceptable carrier therefore.

6. The pharmaceutical composition as defined in claim 5 further comprising a growth promoting agent.

20 7. A pharmaceutical composition comprising a compound as defined in claim 1 and at least one additional therapeutic agent selected from the group consisting of parathyroid hormone, bisphosphonates, estrogen, testosterone, progesterone, selective estrogen receptor modulators, growth hormone secretagogues, growth hormone, progesterone receptor modulators, anti-diabetic agents, anti-  
25 hypertensive agents, anti-inflammatory agents, anti-osteoporosis agents, anti-obesity agents, cardiac glycosides, cholesterol lowering agents, anti-depressants, anti-anxiety agents, anabolic agents, and thyroid mimetics.

30 8. A method for treating or delaying the progression or onset of muscular atrophy, lipodistrophy, long-term critical illness, sarcopenia, frailty or age-related functional decline, reduced muscle strength and function, reduced bone density or growth, the catabolic side effects of glucocorticoids, chronic fatigue syndrome, bone

fracture repair, acute fatigue syndrome and muscle loss following elective surgery, cachexia, chronic catabolic state, eating disorders, side effects of chemotherapy, wasting, depression, nervousness, irritability, stress, growth retardation, reduced cognitive function, male contraception, hypogonadism, Syndrome X, diabetic complications or obesity, which comprises administering to a mammalian species in need of treatment a therapeutically effective amount of a compound as defined in claim 1.

9. A method according to claim 8 further comprising administering, concurrently or sequentially, a therapeutically effective amount of at least one additional therapeutic agent selected from the group consisting of other compounds of formula I, parathyroid hormone, bisphosphonates, estrogen, testosterone, progesterone, selective estrogen receptor modulators, growth hormone secretagogues, growth hormone, progesterone receptor modulators, anti-diabetic agents, anti-hypertensive agents, anti-inflammatory agents, anti-osteoporosis agents, anti-obesity agents, cardiac glycosides, cholesterol lowering agents, anti-depressants, anti-anxiety agents, anabolic agents and thyroid mimetics.